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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,192	11/25/2003	Srikanth Suryanarayanan	140312-1/YOD GERD:0073	9057

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EXAMINER	
CHENG, JACQUELINE	
ART UNIT	**PAPER NUMBER**
3768	

DATE MAILED: 07/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/723,192	SURYANARAYANAN ET AL.	
	Examiner	Art Unit	
	Jacqueline Cheng	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/8/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1-6, 10-19, 23-31, 35-39** are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,842,638 B1 (herein referred to as Suri et al.).

3. **Claims 1-5, 11, 14-18, 24, 27-30, 36, and 39:** Suri et al. discloses an apparatus and method for producing an angiographic image representation of a subject. These systems can differentiate the vasculature form the non-vascular structures. An imaging scanner, such as a CT or an MRI, acquires imaging data from a portion of a subject including vascular contrast, such as a head/neck region. A reconstruction processor reconstructs an image from the data and then converts the image into an edge-enhanced image having enhanced vascular edges by applying mathematical transformation (col. 2 line 64-col. 3 line 8). A segmentation engine can then employ tracking systems which track a vessel starting from an initial seed location and quantify the vessel lumen (a geometric and a functional template) (col. 2 line 29-34). This segmentation engine also separates the vascular regions from the non-vascular regions. Pixels corresponding to bone/air/vascular structures are assigned a black pixel and tissue background is assigned a gray pixel. The mask processor then removes the vascular regions, the more intense pixels, from this

intermediate mask. The resulting slice mask contains only the least intensity pixels of the non-vascular structures with the blood vessels removed (the bone mask) (col. 12 line 27-54). This mask is then subtracted to generate the image of the vascular region of interest in either two dimensions or three dimensions (col. 8 line 22-38).

4. **Claims 6, 19, and 31:** Suri et al. discloses an edge volume processor that emphasizes the edges of the vasculature which in itself is determining a maximum gradient, which is the edge, for the area (col. 8 line 8-12).

Claim 10: Suri et al. discloses differentiating the vasculature from background levels, which would include things like the table or support the patient is being imaged upon (col. 2 line 29-31).

5. **Claims 12, 25, and 37:** Suri et al. discloses a dynamic constrained region growing process of identifying vessel centers, finding a first vessel direction , and then estimating vessel boundaries by iteratively propagating a closed geometric contour arranged about the first vessel center. This is done for each vessel center and the estimated boundaries are interpolated to form a vascular tree (col. 3 line 27-40).

6. **Claims 13, 26 and 38:** Suri et al. discloses smoothing the image which, after processed, will be an image of only the vascular structure (col. 14 line 30).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 7-9, 20-22, and 32-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Suri et al. as applied to claims 1, 14 and 27 above, and further in view of US Patent No. 6,351,571 B1 (herein referred to as VanMetter et al.). Suri et al. teaches using edge enhancement methods to help extract vascular structure in medical imaging. What Suri et al. does not specifically teach is partitioning the image into sub-regions and implementing a fast algorithm in one sub-region and a slower, complex algorithm in another sub-region. These teachings are well known in the art as evident by VanMetter et al. VanMetter et al. teaches using different algorithms for different regions to enhance edges. The first algorithm is a fast algorithm of just computing the convolution to obtain the low-frequency component of the image. The second algorithm, the masking convolution, is a complex one, especially when applied to real image (3D) space (col. 1 line 55-col. 2 line 44). It would be obvious to one with ordinary skill in the art at the time of the invention to combine VanMetter et al. with Suri et al. as Suri et al. teaches using edge enhancements, for which one could use VanMetter et al.'s edge enhancement algorithms to execute the edge enhancement.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacqueline Cheng whose telephone number is 571-272-5596. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on 571-272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JC

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